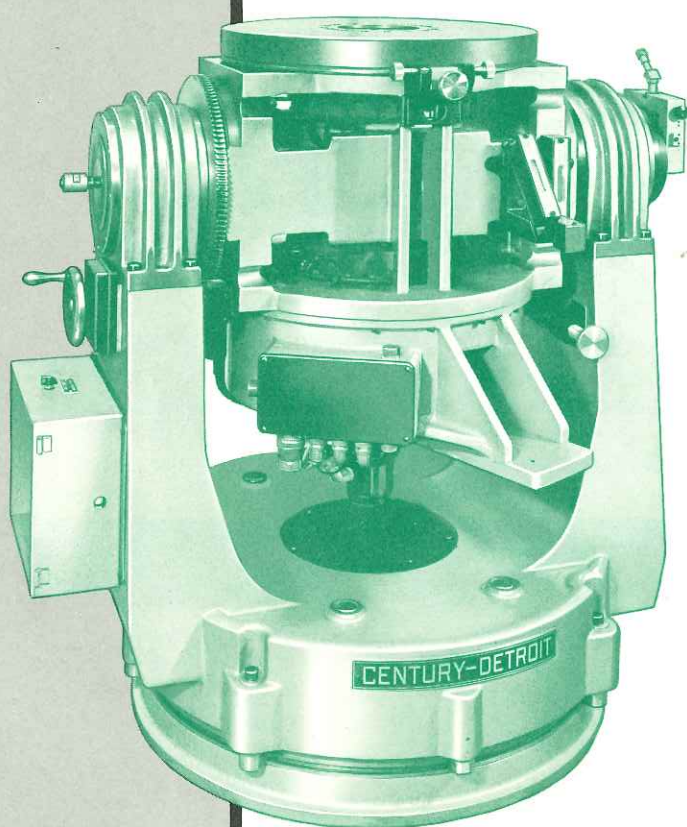


CENTURY-DETROIT

AEROSTATIC* PRECISION TEST TURNABLES

16" to 36" TABLE DIAMETERS WITH AIR BEARING SPIN AXIS



CD-24-A AEROSTATIC*
SPIN AXIS BEARING
TEST TURNABLE

- NO RANDOM TORQUES ON SPIN AXIS, BECAUSE OF AEROSTATIC* RADIAL-THRUST (SPOOL) BEARING
- NEGLIGIBLE STATIC OR RUNNING FRICTION
- RUGGED, STABLE CONSTRUCTION FOR LONG-TERM CONSISTENCY OF PERFORMANCE
- LESS THAN ± 0.5 SEC. SPIN AXIS WOBBLE AT RATED LOAD
- PART OF A COMPLETE SYSTEM OF COMPATIBLE TABLE AND GYRO ELECTRONIC ACCESSORIES
- CAPACITIES COMPARABLE TO NEXT LARGER SIZE TABLES THAT EMPLOY PURE THRUST BEARING

CENTURY-DETROIT



CD-24-A Table with Table Electronics Group

Century-Detroit's 16"-36" Diameter Precision Air Bearing Test Turntables are the central components of a comprehensive test system which enables the user to define gyro performance completely. Each turntable is assembled with the utmost care, and is tested at our plant to rigorous standards of mechanical performance before operating with the electronic system. After passing these tests, a full series of closed loop tests of table and system performance in all modes of operation is conducted.

BASE & AIR BEARING AZIMUTH AXIS

The Table rests on a set of leveling pads which are supported on an accurately ground flat upper surface of the base casting. This unit is installed on the user's isolation block, leveled with a machine level, and grouted in place. The Table is then placed on the base and the leveling pads are adjusted independently of the permanently located base so that the tilt axis is accurately horizontal. Leveling to $\pm 1 \text{ sec.}$ is easily done.

The lower faces of the leveling pads are air pressurized for azimuth adjustment and a tangent screw micrometer is provided so that azimuth can be set without difficulty to $\pm 1 \text{ sec.}$ When pressurized, the table can be rotated in azimuth by the touch of a cigarette. Since these tables are very solidly constructed with heavy cast sections for long term stability of dimensions and performance, this air bearing azimuth axis is a real bonus for the operator.

TRUNNION AXIS

The trunnion is supported by two pairs of Timken tapered roller bearings of the highest available precision. The trunnion can be rotated thru $\pm 190^\circ$ from the upright position by a hand-wheel driving a worm and worm gear. The axis is then clamped and adjusted to exact position by a micrometer tangent screw. Readout for this axis is a 6" Gurley Unisec, which is usually supplemented by a cluster of three bubble levels, reading horizontal, vertical and polar positions. Counterweights are provided so that the trunnion is nearly balanced about its axis.

The trunnion is a heavy casting, specifically designed to minimize tilt axis flexure as a function of applied loads. The structure has a rib pattern so arranged as to provide a nearly uniform flexural moment of inertia and therefore a constant stiffness over the entire range of tilt axis travel.

MINIMUM-TORQUE AEROSTATIC* SPIN AXIS

The spin axis of these tables is supported by a radial thrust air bearing, symmetrical about both spin and tilt axes. Two rows of capillary metering pockets support the journal and one row supports each thrust face. All axial constraint is applied in tension, greatly reducing axial end play and improving bearing stability. Flow paths are carefully designed so that the level of random tangential torques is extremely low. Static stiffness in both linear directions and in moment loading is unusually high, as a result of precisely controlled air film thickness over both thrust and journal surfaces. Also, as a result of the careful control and uniformity of the film thickness, the bearing can be operated at quite high supply pressures without excess air consumption or aerodynamic instability of the bearing film. Consequently, these tables will handle loads that are normally considered feasible only for the next size larger units which employ a thrust bearing without journal stabilization.

SPIN AXIS CONFIGURATION

The spin axis carries a suitably sized dc bearingless torque motor, a bearingless tachometer, the 720 pole, 12" Inductosyn readout encoder, and a 50 ring slip ring package. If servoed slip rings are furnished, the microsyn or potentiometer slip ring error pickoff is also on this axis, together with the mechanical overtravel stop which prevents the slip rings from falling out of synchronization if the servo is shut off.

The table top is of either stainless steel or plated Meehanite with a hole pattern as required. Electrical quick-disconnect connectors are provided at the table top.

MATERIAL

These tables are constructed of close-grain, fully stabilized Meehanite. Components of the AEROSTATIC* bearing are made of a corrosion-proof variety of this material. Meehanite is used because it has the best performance of any ferrous material for long-term dimensional stability and freedom from porosity and insertions.

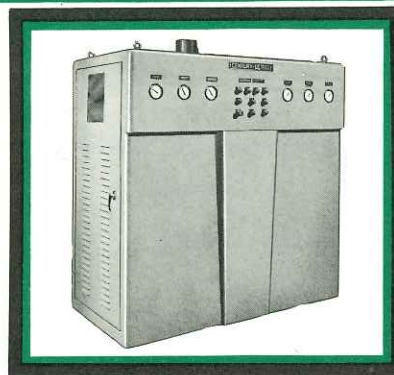
SAFETY INTERLOCKS

The torque motor is disabled by a limit switch when the table clamp is operated and by a pressure switch when the supply air pressure drops below a safe level. Monitor lights for these functions are provided in the control panel.

ELECTRONIC SYSTEM CONSOLE

The contents of the Console are determined by the overall system requirements. A full set of table control modules is available, as well as the usual displays of table angle (either absolute or incremental) and elapsed time between fixed interval markers. Also available, if a complete gyro test station is required, are the various gyro test modules, such as microsyn supply, heater supply, wheel supply, gyro preamp and servo amplifier, gyro control panel, torquer exciters, etc. (See brochure on Electronic System and electronic product notes.)

PNEUMATIC GENERATOR



Model CD-9PG-90 Pneumatic Generator

This unit is part of Century-Detroit's product line of auxiliary devices for gyro test systems, and is one of a family of several generators with a wide range of capacities (see brochure on Pneumatic Generators).

It provides 9 SCFM of 1 micron, -50°C dew-point instrument air at up to 120 PSIG. It is fully automatic in operation, having integral dryer, cooler and purge cycle.

OPTIONS AND ALTERNATIVES

Tilt Axis

May be provided with air bearing, and torque motor drive with position or rate servo control. An Inductosyn readout is available for this option.

A gear motor drive can be furnished for the standard roller bearing tilt axis.

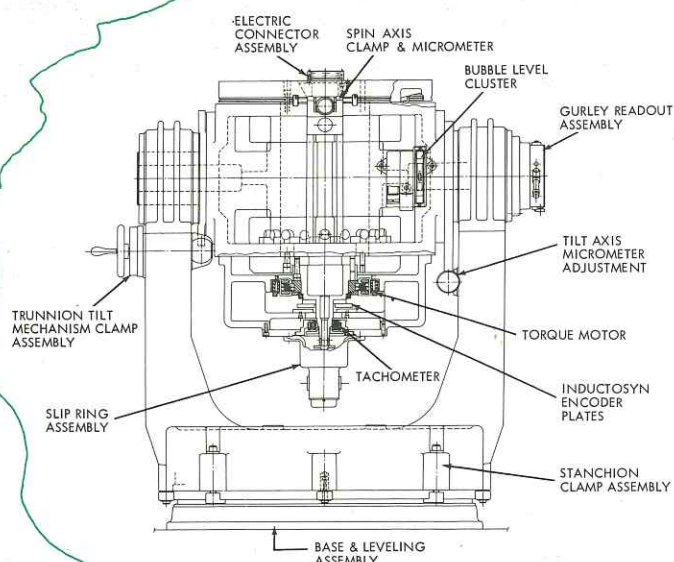
Spin Axis

Servoed slip ring package, with more rings, if needed.

Slotless DC torque motor or AC brushless torque motor for low axis friction.

The standard readout encoder is, as noted above, a 720 pole, 12", $\pm 1/2$ sec. Inductosyn.

Other encoders can be furnished on special order.



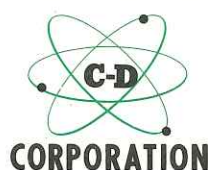
DIM.	CD-16-A	CD-24-WA CD-24-A	CD-36-WA CD-36-A
Table Top Dia.	16	24	36
Tilt Axis Ht.	30	38	48
Overall Ht.	38	48	64
Base Dia.	24	36	52
Span Along Tilt Axis	36	46	62

SPECIFICATIONS

Model No.	CD-16-A	CD-24-A	CD-24-WA	CD-36-A	CD-36-WA
Table Top Diameter (in.)	16	24	24	36	36
Thrust Stiffness (lb./in.)	5.4×10^6	7×10^6	12.5×10^6	12.75×10^6	22.5×10^6
Radial Stiffness (lb./in.)	4.0×10^6	4.5×10^6	6.6×10^6	17.5×10^6	17.5×10^6
Moment Stiffness (in.-lb./rad.)	1.97×10^8	4.07×10^8	7.8×10^8	22.7×10^8	33.8×10^8
Moment Stiffness (in.-lb./sec.)	955	1975	3425	11050	16400
Normal Working Load (lb.)	60	150	250	500	750
Max. Load in Vertical Position (lb.)	800	2100	3000	4000	7800
Counterweight capacity (lb.)	35	100	180	250	350
Air Consumption (SCFM)	3.0	4.0	5.5	10.5	12.5
Weight (lb.)	2200	4000	4000	8000	8000
Std. Torque Motor Size (ft.-lb.)	2.7	7.0	7.0	11.0	22.0
*Spin axis wobble (sec.)	± 0.5	± 0.4	± 0.35	± 0.4	± 0.4
*Spin axis eccentricity (in., T.I.R.)	.000030	.000025	.000025	.000030	.000030
*Tilt axis wobble (sec.)	± 1	± 1	± 1	± 1	± 1
*Orthogonality (sec.)	± 1	± 1	± 1	± 1	± 1
Tilt axis freedom (deg.)	± 190	± 190	± 190	± 190	± 190
Droop about tilt axis (sec.) at 90° tilt; normal working load @ 12" above top	0.75	1.75	1.67	1.3	1.3

*NOTE: (1) All accuracies are with or without load and in any tilt position.
(2) Table top hole pattern: as desired by customer.

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Manufacturers of Gyro and System Test-Turntables, Multi-Axis Gimballing Systems, Base Motion Simulators, Linear and Angular Vibrators, Test Stands, and Specialized Large Linear and Rotary Fully Compensated Pressurized Liquid and AEROSTATIC* Bearing Applications For The Aerospace Industry . . . Call Area Code 313, WA 3-8088.

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